DOCUMENT RESUME

ED 242 715 SP 024 134

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TITLE Teachers Who Seek Computer Education: Their Attitudes, Needs, and Motivation.
PUB DATE 24 Apr 84
NOTE 20p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 23-27, 1984).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Comparative Analysis; *Computer Literacy; Educational Technology; Educational Trends; Elementary Secondary Education; Futures (of Society); Higher Education; Inservice Teacher Education; Knowledge Level; Motivation Techniques; *Teacher Attitudes; *Teacher Motivation

ABSTRACT

Teachers (n=61) who were participants in computer literacy workshops at Southern Illinois University were compared with a general sample of teachers in terms of their needs, attitudes, and motivation toward computer education. Nationwide data for comparison were taken from "Computers in the Classroom: A NEA Survey Report." The NEA sample of 1,700 yielded a response rate of 72.5 percent. Southern Illinois University workshop participants were asked to respond to 78 items on: (1) sources of encouragement for using computers with students; (2) level at which participants perceived themselves to be informed about computer subjects; (3) interest in learning how to use a computer for various purposes; (4) interest in learning about subjects related to computers in the classroom; (5) extent to which they believed that the future of schools and teaching would be influenced by computers; and (6) extent to which they believed that aspects of their teaching careers would be influenced by the computer movement. Comparison of group means indicated significant differences on several survey items. Workshop participants were more likely to report support from colleagues, administration, and students. Participants also had an interest in a wider range of computer subjects, were less threatened by the projected role of computers in education, and tended to shift their attitudes and interests over the course of the semester. (JMK)

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ED242715

Teachers Who Seek Computer Education: Their Attitudes, Needs, and Motivation

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Paper presented at the Annual Meeting of
The American Educational Research Association
April 24, 1984
New Orleans

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SP024134

Abstract

This paper compares teachers who were participants in computer literacy workshops with a general sample of teachers in terms of their needs, attitudes and motivation toward computer education. Comparison of group means indicated significant differences on several survey items, including the following: workshop participants were more likely to report support from colleagues, administration and students; they had an interest in a wider range of computer subjects, were less threatened by the projected role of computers in education, and tended to shift their attitudes and interests over the course of the semester.

Insight into the needs, attitudes, and motivation of school teachers and administrators who were voluntarily seeking to update their technological skills may give teacher educators some valuable clues as to how to stimulate such professional growth in other teachers.

Teachers Who Seek Computer Education: Their Attitudes, Needs, and Motivation

Introduction

Recent articles in both educational journals and the popular press indicate consensus on two points about computer education for teachers: first, that teachers need computer knowledge and skills in order to promote technological competence in their students; and second, that only a small percentage of teachers possess this necessary computer competence.

The objective of the present study was to identify the needs, attitudes, and motivation characteristic of classroom teachers who seek to become competent in the use of computers. It was predicated on the assumptions that the impetus for professional growth comes from the individual and that examining the conditions associated with self-initiated learning would provide insight about how such conditions could be promoted.

The following specific objectives were met by comparing survey data from a general sample of teachers with those of teachers who had signed up for a workshop in computer literacy:

(1) to describe similarities and differences between the workshop participants and the general teacher sample in terms of their attitudes, needs, and motivation related to computer education;

(2) to identify and discuss factors associated with teachers' predispositions to seek computer education;

(3) to identify changes in attitudes and perceptions of need among teachers who have become more competent and knowledgeable about computers;

(4) To recommend policy at district and university levels that will promote factors associated with professional growth in computer literacy.

Methods and Data Source

The Subjects

Nationwide data for comparison were taken from "Computers in the Classroom: A NEA Survey Report" (C. Norman, National Education Association, 1982). The NEA sample of 1700 teachers was selected randomly from active membership files. Surveys were sent and collected by mail. Initial and follow-up mailings yielded a usable response rate of 72.5%.

The data on teachers who seek computer education was collected from 61 students who took CIM 498M, Workshop in Computer Literacy, through Southern Illinois University during the summer and fall of 1983. Four sections of this course were taught during this time period, one on campus and three at local school district sites. The courses were taught by three faculty members from the Department of Curriculum, Instruction, and Media. Students were employed in both elementary and secondary settings, with close to 20% employed in positions as other than classroom teachers. This latter group included administrators, media specialists and students who had recently completed student teaching. Surveys conducted on workshop participants were administered during the first or second class meeting of the course and returned to the researcher by the course instructors.

The Survey

The original NEA survey consisted of 133 items for all respondents and an additional 45 questions for teachers who were currently using computers. It elicited responses about teachers' knowledge of computers, their instructional experience with them, and their opinions about a number of computer-related topics. Items were written in alternate- or multiple-choice format.

For the purpose of the present study, only those sections which yielded information about teacher motivation, needs, and attitudes were included.

Participants were asked to respond to 78 items on the following topics.

(1) sources of encouragement for using computers with students;

(2) level at which participants perceived themselves to be informed about computer subjects;

(3) interest in learning how to use a computer for various purposes;

(4) interest in learning about subjects related to computers in the classroom;

(5) extent to which they believed that the future of schools and teaching would be influenced by computers;

(6) extent to which they believed that aspects of their teaching careers would be influenced by the computer movement.

To meet the needs of the present study, three additional items were added to the NEA survey. Workshop participants were asked about the extent of their past computer experience as well as their interest in word processing and data management software.

Statistical Analysis

Procedures for NEA data analysis are described in the survey report available through the National Education Association. These descriptive statistics provided the basis for comparison with responses from workshop participants.

Descriptive statistics for the workshop participants were obtained through the use of the SPSS frequencies program. Comparison of the two groups was accomplished by tests of significant differences. For items which yielded proportional data, a z-test for significant difference in proportions of independent data was used. For the majority of items, which yielded responses based on a continuum, a t-test for significant difference in means was employed.

Comparison of Workshop Participants With the General Teacher Sample

Sources of Encouragement

Table 1 indicates that, when asked who had encouraged them to use computers with their students, a significantly higher percentage of workshop participants reported encouragement from teaching colleagues, family and friends, principals, students, superintendents, curriculum specialists and school boards.

(Insert Table 1 here)

Level of Information

Respondents in both groups were asked to rate themselves on how well informed they were, using a scale from 1 (not well informed) to 4 (very well informed). Table 2 indicates that for both groups, mean responses were between 1 and 2 on all subjects. The mean response for NEA respondents was significantly higher than the mean for workshop participants in the areas of being informed about commercial software, the criteria for selecting software, and how to write a computer program.

(Insert Table 2 here)

Interest in Learning to Use a Computer

When asked to rate their interest in various subjects on a scale of 1 (little interest) to 4 (great interest), the mean response for both NEA and workshop participants was between 2 and 3 on most items. Table 3 indicates that the mean responses for workshop participants were significantly higher than for NEA respondents in the areas of computer literacy, simulations, and maintenance of student records.

Response of workshop participants to two items not included in the original NEA survey indicated that word processing and data management were of high interest.

(Insert Table 3 here)

Interest in Learning Computer Related Subjects

Survey takers were given a list of computer-related subjects and asked to check all of those in which they were interested. Table 4 indicates that a significantly higher percentage of workshop participants were interested in learning about the following subjects: computer instructional applications, how to operate a computer, how to write computer programs, how to select commercial courseware, programming languages, curriculum design for computerization, educational policy for computers, computer users' network, computer history, and courseware copyright protection.

(Insert Table 4 here)

Future Impact of Computers on Schools and Teaching

Table 5 indicates that when respondents were asked to rate the extent to which they believed that certain events would occur by 1990 on a scale from 1 (unlikely to occur) to 3 (very likely to occur), mean scores for workshop participants were significantly higher on all items dealing with the growing role and importance of computers in education. In their mean scores on one of the negative implications of computers, i.e., that computers will replace some teachers, NEA respondents were significantly higher.

(Insert Table 5 here)

Effects of Computers on Aspects of Teaching Career

When respondents were asked to rate the effect that the computer movement would have on their careers on a scale from 1 (negative effect) to 3 (positive effect), mean ratings for workshop participants were higher for all but one item. Workshop participants were significantly more positive about the impact of computers on all of the following aspects of their teaching careers: professional challenge, teaching effectiveness, job satisfaction, subject assignment, teaching certification, and salary.

(Insert Table 6 here)

Changes in Needs and Attitudes Among Workshop Parcicipants

When the NEA items dealing with interests and beliefs were administered near the end of two of the workshops, significant differences were apparent on several items. Post-course respondents were more likely than pre-course respondents to express an interest in developing a network of computer users and were stronger in their advocacy of each of the following school district policies: adequate hardware and software provisions for computer projects; adequate support services for computer projects; and adequate preservice and inservice training to support computer projects.

Discussion

Comparison of the general sample of teachers with teachers who had signed up for a computer literacy workshop revealed that certain attitudes, interests, and sources of encouragement were more prevalent among those who sought to update their skills. When the variables associated with these computer literacy "seekers" are of the type which can be controlled or manipulated in the school environment, the findings may have clear implications for teacher educators, supervisors, and staff developers.

Differences in Sources of Encouragement

When asked about the sources which had encouraged them to use computers with students, "seekers" named many sources from within the school environment, including students, colleagues, and administrators. The fact that so much of their perceived support came from within the schools implies that providing a nurturing climate at the building level may be a starting point for staff development for computer competence.

Differences in Knowledge and Skills

Prior training or experience apparently did not make teachers more likely

to sign up for a course in computer literacy; the general sample were quite similar to the workshop group in their lack of a computer background. Both groups rated themselves low in knowledge about all computer subjects, and "seekers" were even lower than the general group on several self-estimates of knowledge. Whether their comparative ignorance was real or perceived, the perception of being "illiterate" may be a factor in getting teachers to realize that computer training would be beneficial. Thus staff development should include a plan to help teachers to analyze the extent of their knowledge about computers.

Differences in Computer Interests

Computer "seekers" reported a significantly higher interest in many subjects and uses for the computer than did the general sample of teachers. Some information not included in the survey data is pertinent to this difference: though most of the workshop participants reported little or no computer training, the majority of them came from school districts which had included a computer orientation component in recent inservice programs. Because they had at least a superficial exposure to the vocabulary associated with computers, they may have been more likely to recognize and identify the areas of interest listed on the survey. It seems plausible that teachers need to know a little about computers before they can identify their interests. Thus, brief, practical school or district-wide orientations to computers could put teachers in a better position to articulate their needs and interests.

Differences in Beliefs and Attitudes

Workshop participants were clearly more positive in their perceptions of how computers would influence schools and teaching, as well as their own teaching careers. Though these positive atittudes reflected individual predispositions as well as the way that computers had been introduced into their

school districts, computer beliefs and attitudes appear to be at least to some extent affected by the school district environment. Thus, it would seem reasonable to use school district resources to promote positive attitudes toward computers through such programs as networking and interest groups as well as lenient policies toward observing in other schools and attending computer conferences and exhibits.

Differences in Pre- and Post-workshop Surveys

In pre-course surveys, participants indicated that they had had little computer experience, classifying themselves as ill-informed about most subjects. Though they had heard of programming and software packages, they did not understand how the various programs could apply to education. When asked about their interest in such uses as word processing, simulations, or data management, many responded with a question mark.

By the end of the workshop, participants differed from the general sample as well as from their own pre-course ratings in terms of their computer interests. They saw more of a need for computer networking among teachers and were firmer about the policies that they felt school districts should adopt to promote long-range integration of computers into the curriculum.

Additional evidence of change was evident in open-ended survey questions administered as part of the formative needs assessment for the course. Responses on these indicated a shift from a strong desire to focus on BASIC programming to a perception of greater need for software review and evaluation and for learning word processing and data filing systems.

Implications for Staff Development

Of major interest to anyone seeking to promote continuing education among teachers is information about the intended recipients and what leads them to seek professional self-improvement. Attitudes, needs, and motivation revealed

by the literacy-seekers in this study may give teacher educators some valuable clues about how to stimulate this participation from other educators. Their survey responses, as well as other needs assessment and goal-setting throughout the workshop, provided the basis for the following generalizations about conditions which will provide a climate nurturant of computer competence among teachers.

Minimize the threat that many teachers associate with computers. Teachers who sign up for computer workshops have generally positive attitudes toward the role of computers in education and did not perceive computers as the potential displacers of teachers as many of their colleagues in the general sample did. Coercing or requiring teachers to use computers or take computer coursework is likely to intensify fear and resistance. A more productive approach is to make equipment available where teachers can experiment with it in a non-threatening environment. Voluntary learning is associated with encouragement from students, colleagues, and administrators, so time and resources should be provided to encourage these contacts and other types of informal computer networking. Similarly, teachers who are involved in making the decisions about how computers can best be used in their schools are less likely to impute sinister motives to their introduction.

Give teachers and administrators an active role in school district computer policies. Voluntary participants expressed their belief that teachers should be part of the decisions about the planning for future inservice programs as well as the priorities for computer acquisitions. Post-workshop comments indicated that examination of commercially available software had made participants aware that publishers' claims about ease of use, appropriateness to certain subjects and grade levels, and advantages over conventional presentation methods were often overstated or inaccurate. Because teachers are

more likely to be able to judge the merits of software designed for their particular grade or subject area, they should be encouraged to preview and evaluate such materials.

Administrators and supervisors from the school board on down to the building level are more likely to encourage computer use if they understand and use a system themselves. Regardless of their expertise, however, staff should not bypass teachers in their long- and short-range computer decisions.

Relate computer inservice to practical needs and interests of participants. Voluntary participants are more interested in practical, hands-on experiences than they are in talk about computers. Once they understood what the various terms meant, participants were primarily interested in software packages. Specific programs receiving high priority included word processing, simulations, record-keeping, and enrichment. Topics like the history of computers or their educational implications received low priority, at least until participants had attained a certain level of practical competence.

Introductory material in computer literacy programs necessarily includes a common core of definition and demonstration of computer use. Beyond this level, however, the content of computer inservice should vary as widely as the needs of its participants.

Treat needs assessment and goal-setting as an ongoing process. Needs and goals often shift as participants become more literate and competent in their knowledge and use of computers. Frequently they need to spend some time working with a certain type of software before they can understand its personal application. In pre-course surveys, participants expressed the need to learn to program as their top priority. By the end of the course, though they had spent several sessions learning to program in BASIC, they no longer saw it as a priority. Goals for future inservice were more likely to include word

processing, data management and authoring systems than they were to include programming. Selection of a final project revealed a similar trend. When participants were asked to work with one course component in depth, by far the greatest number of participants chose to run and review software programs appropriate to their grade or subject area. Yet software evaluation had been well behind programming as a priority when they started the course.

Table 1

A Comparison of NEA and Workshop Responses About Sources of Encouragement To Use Computers With Students

Source of Encouragement	NEA Respondents Percent of "Yes" Response	Workshop Respondents Percent of "Yes" Response	z Test of Proportions
Teaching Colleagues	35.1	52.5	-2.71**
School Principal	24.5	39.0	-2.50*
Family, Friends	21.7	49.2	-4.87***
Students	18.8	37.3	-3.47***
Local or State Association	14.0	18.6	- .982
Curriculum Specialist	13.4	25.4	-2.58**
School Superintendent	12.6	35.6	-4.97***
Subject Matter Organization	10.6	15.3	-1.13
Individual Parents	10.0	10.2	- .05
School Board	9.6	20.3	-2.64***
Parent Groups	5.4	10.2	-1.55
Community Groups	3.5	5.1	- .641

*$p < .05$ **$p < .01$ ***$p < .001$

Table 2

A Comparison of NEA and Workshop Responses About How Well Respondents Were Informed on Computer Subjects

Computer Subject	NEA Respondents Mean Response Score	NEA Respondents Standard Deviation	Workshop Respondents Mean Response Score	Workshop Respondents Standard Deviation	t
Kinds of Computer Marketed	1.61	.794	1.61	.640	.000
Parts of System	1.46	.772	1.53	.698	- .706
Operational Characteristics	1.56	.801	1.49	.622	.819
How to Operate a Computer	1.60	.821	1.64	.708	- .427
Commercial Software	1.47	.750	1.31	.534	2.23*
Commercial Courseware	1.40	.706	1.30	.558	1.34
Criteria for Selecting Computer Program for Instruction	1.32	.694	1.12	.370	3.89***
How to Write a Computer Program	1.40	.777	1.20	.480	3.03**

*p < .05 **p < .01 ***p < .001

Table 3

A Comparison of NEA and Workshop Responses About Interest in Learning to Use a Computer for a Specific Purpose

Purpose of Computer Use	NEA Respondents		Workshop Respondents		t
	Mean Response Score	Standard Deviation	Mean Response Score	Standard Deviation	
Drill & Practice	2.37	1.073	2.66	1.035	-2.08*
Remedial Drill	2.60	1.092	2.88	1.027	-2.02*
Enrichment	2.86	1.077	2.98	1.051	- .848
Computer Literacy	2.37	1.079	2.78	1.093	-2.79**
AV to Accompany Presentation	2.29	1.056	2.51	1.037	-1.56
Standardize Presentation	2.30	1.049	2.43	1.093	- .871
Monitor Student Mastery	2.41	1.075	2.60	.972	-1.45
Testing to Monitor Progress	2.50	1.069	2.59	.937	- .709
Simulations	2.74	1.053	3.05	.999	-2.30*
Computer Games	2.51	1.076	2.79	1.074	-1.91
Maintain Student Records	2.68	1.148	3.02	1.051	-2.39*
Word Processing[#]	-	-	3.09	1.04	-
Data Management	-	-	2.97	1.159	-

*$p < .05$

[#]These categories were not included in the original form of the NEA Survey, so data is available only for workshop participants.

Table 4

A Comparison of NEA and Workshop Responses About Interest in Computer Subjects

Computer Subject	NEA Respondents Percent of "Yes" Response	Workshop Respondents Percent of "Yes" Response	z Test of Proportions
Computer Instructional Applications	59.1	80.7	-3.36***
How to Operate a Computer	58.8	81.0	-3.45***
How to Write Computer Programs	56.6	76.8	-3.11**
How to Select Commercial Courseware	42.3	79.3	-5.68***
Programming Languages	39.0	63.8	-3.85***
Curriculum Design For Computerization	35.6	52.5	-2.68**
K-12 Computer Science Curriculum	22.1	23.7	- .29
Educational Policy for Computers	22.2	40.0	-3.45***
Computer Users Network	19.2	29.5	-1.97*
How to Teach Computer Science	18.6	18.3	.059
Computer History	11.7	24.6	-2.99**
Courseware Copyright Protection	9.9	24.6	-3.64***

*$p < .05$ **$p < .01$ ***$p < .001$

Table 5

A Comparison of NEA and Workshop Responses About Future Impact of Computers on Schools and Teaching

1990 Event	NEA Respondents Mean Response Score#	NEA Respondents Standard Deviation	Workshop Respondents Mean Response Score#	Workshop Respondents Standard Deviation	t
Learning by Computer in School will be Common	2.44	.618	2.77	.462	-5.34***
Learning by Computer Outside of School will be Common	2.40	.681	2.72	.490	-4.82***
Most Public Schools will Have Computers In the Classroom	2.37	.708	2.69	.620	-3.90***
Knowing How to Use a Computer Will be Regarded as a Basic Skill	2.41	.663	2.71	.558	-4.05***
Schools Without a Computer Curriculum will be Regarded as Inadequate	2.29	.719	2.51	.566	-2.91**
Teachers with Computer Skills Will be in Great Demand	2.61	.575	2.78	.418	-2.98**
Computers will Render Many Teaching Skills Obsolete	1.71	.732	2.51	.705	-8.55***
Computers Will Stimulate Innovative Teaching	2.47	.618	2.67	.510	-3.80***
Computers will Replace Some Teachers	1.64	.704	1.45	.680	2.07*
Interest in Computers Will Wane	1.45	.628	1.43	.415	.35

*p < .05 **p < .01 ***p < .001

#"No Opinion" responses deleted from calculations

Table 6

A Comparison of NEA and Workshop Responses About Future Effect Of Computers on Aspects of Teaching Career

Aspect of Teaching Career	NEA Respondents Mean Response Score#	NEA Respondents Standard Deviation	Workshop Respondents Mean Response Score#	Workshop Respondents Standard Deviation	t
Professional Challenge	2.74	.501	2.98	.139	-9.67***
Teaching Effectiveness	2.66	.536	2.89	.317	-4.97***
Job Satisfaction	2.56	.579	2.80	.448	-3.66***
Subject Assignment	2.28	.555	2.44	.503	-2.07*
Teaching Certification	2.21	.561	2.38	.491	-2.30*
Grade Level Assignment	2.18	.480	2.26	.444	-1.19
Salary	2.07	.509	2.32	.515	-3.25**

*$p < .05$ **$p < .01$ ***$p < .001$

#No opinion responses deleted from calculations.